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CA 2438765 A1 2002/08/29

(21) **2 438 765**

(12) **DEMANDE DE BREVET CANADIEN  
CANADIAN PATENT APPLICATION**

(13) **A1**

(86) Date de dépôt PCT/PCT Filing Date: 2002/02/18  
(87) Date publication PCT/PCT Publication Date: 2002/08/29  
(85) Entrée phase nationale/National Entry: 2003/08/20  
(86) N° demande PCT/PCT Application No.: EP 2002/001713  
(87) N° publication PCT/PCT Publication No.: 2002/066085  
(30) Priorité/Priority: 2001/02/20 (101 08 083.2) DE

(51) Cl.Int.<sup>7</sup>/Int.Cl.<sup>7</sup> A61L 15/00

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(54) Titre : PANSEMENT  
(54) Title: WOUND DRESSING

(57) Abrégé/Abstract:

The invention relates to a wound dressing, in particular a wound compress, comprising a layer containing active charcoal, at least one further layer, such as a sleeve for the active charcoal containing layer, an absorbent layer, a clothes protection layer, or similar and an agent with anti-microbial effect, characterised in that the agent with anti-microbial effect is contained in the at least one further layer.



(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES  
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG(19) Weltorganisation für geistiges Eigentum  
Internationales Büro(43) Internationales Veröffentlichungsdatum  
29. August 2002 (29.08.2002)

PCT

(10) Internationale Veröffentlichungsnummer  
WO 02/066085 A1

- (51) Internationale Patentklassifikation<sup>7</sup>: A61L 15/00 LEUCHTEN, Elke [DE/DE]; Sprödenalstrasse 88, 47799 Krefeld (DE). WOLF, Thomas [DE/DE]; Schneebergstr. 31, 56203 Höhr-Grenzhausen (DE). PONTZEN, Thomas [DE/DE]; Freie Erde 14, 50737 Köln (DE).
- (21) Internationales Aktenzeichen: PCT/EP02/01713
- (22) Internationales Anmeldedatum:  
18. Februar 2002 (18.02.2002) (74) Anwalt: LEINWEBER & ZIMMERMANN; Rosental 7, 80331 München (DE).
- (25) Einreichungssprache: Deutsch (81) Bestimmungsstaaten (national): CA, JP, US.
- (26) Veröffentlichungssprache: Deutsch (84) Bestimmungsstaaten (regional): europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).
- (30) Angaben zur Priorität:  
101 08 083.2 20. Februar 2001 (20.02.2001) DE
- (71) Anmelder (für alle Bestimmungsstaaten mit Ausnahme von US): LOHMANN & RAUSCHER GMBH & CO. KG [DE/DE]; Irlicher Str. 55, 56567 Neuwied (DE). Veröffentlicht:  
— mit internationalem Recherchenbericht
- (72) Erfinder; und Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.
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WO 02/066085 A1

(54) Title: WOUND DRESSING

(54) Bezeichnung: WUNDAUFLAGE

(57) Abstract: The invention relates to a wound dressing, in particular a wound compress, comprising a layer containing active charcoal, at least one further layer, such as a sleeve for the active charcoal containing layer, an absorbent layer, a clothes protection layer, or similar and an agent with anti-microbial effect, characterised in that the agent with anti-microbial effect is contained in the at least one further layer.

(57) Zusammenfassung: Die Erfindung betrifft eine Wundauflage, insbesondere Wundkompress, mit einer aktivkohlehaltigen Schicht, mindestens einer weiteren Schicht, wie etwa einer Umhüllung für die aktivkohlehaltige Schicht einer Saugschicht, einer Wäscheschutzschicht o. dgl., und einem antimikrobiell wirksamen Mittel, dadurch gekennzeichnet, dass das antimikrobiell wirksame Mittel in der mindestens einen weiteren Schicht enthalten ist.

Translated Text of WO 02/066,085 (PCT/EP02/01713)  
with Amended Pages and Claims Incorporated Therein

## WOUND DRESSING

The invention concerns a wound dressing, especially a wound compress, which comprises a layer that contains activated carbon, at least one other layer, such as a cover layer for the layer that contains the activated carbon, an absorbent layer, a layer for protecting the clothing, or the like, and an antimicrobial agent.

Wound dressings of this type, in the form of surgical dressings or tampons, are described, for example, in EP 0 053 936 B1. In the products described in the cited document, the layer that contains the activated carbon is used to adsorb malodorous substances and microorganisms and therefore contributes to a reduction of the risk of infection in the treatment of wounds. In this regard, the activated carbon layer of the previously known wound dressing may be present in the form of an activated carbon substance and be arranged between two cover layers. To achieve further reduction of the risk of infection, in the product described in the cited document, an antimicrobial agent is adsorbed on the layer that contains the activated carbon and is present in an amount that saturates no more than 20% of the

adsorbent sites that are capable of adsorbing the antimicrobial agent. According to the cited document, antimicrobial agents that may be used are iodine, chlorinated phenols, antibiotics, and the like. The disclosed content of EP 0 053 936 B1 with respect to the antimicrobial agents and activated carbon layer described therein is herewith incorporated in the present specification by explicit reference.

A problem that has been encountered with the product known from the cited document is that the layer containing the activated carbon is already covered to a large extent by the antimicrobial agent, so that it is no longer fully available for the adsorption of malodorous substances, bacteria, or the like.

To solve this problem, WO 86/05,970 (US 4,817,594) proposes a wound dressing with a layer that contains activated carbon but no antimicrobial agent. In this wound dressing, the risk of infection is reduced by providing, in addition to the layer containing the activated carbon, another layer made of a permeable material and a layer made of a semipermeable material on the outside of the dressing. Together, these two layers have antibacterial properties, because the growth of the bacteria adsorbed on the layer containing the activated carbon is inhibited by restriction of the oxygen supply, and the additional layers provide a barrier to bacteria, thereby preventing

contamination from the outside. The cited document also describes a method for producing a layer containing activated carbon, in which a flat textile material is produced by impregnating suitable fibers with a solution of inorganic halogen compounds and then heating them under controlled conditions to effect the activation. The disclosed content with respect to the layers containing activated carbon and their production, which are described therein, is herewith incorporated in the present specification by explicit reference.

In addition, still another wound dressing that has a layer containing activated carbon is described in EP 0 311 364, in which at least 10% of the pore volume of the activated carbon is present in the form of mesopores. The disclosed content of EP 0 311 364 is also herewith incorporated in the present specification by explicit reference.

Furthermore, WO 86/05,971 A1 discloses a wound dressing with an additional layer that contains an antimicrobial agent. This layer consists of an electrically conductive meshed fabric. Finally, EP 0 691 113 A1 describes a wound dressing in which the absorbent layer is impregnated with an antiseptic.

Although the risk of infection in the treatment of wounds can be significantly reduced with the products described above, it has been found that, even with the use of layers containing

activated carbon, including those impregnated with an antimicrobial agent, wound infections occur again and again.

In light of the above-described problems associated with the state of the art, the object of the invention is to make available a wound dressing, especially a wound compress, with which the risk of infection in the treatment of wounds can be further reduced.

In accordance with the invention, this object is achieved by the modification, which is specified in the characterizing clause of Claim 1, of a wound dressing of the type mentioned at the beginning, for example, the wound dressing known from EP 0 053 936 B1.

This invention is based on the surprisingly simple recognition that the antimicrobial properties of an antimicrobial agent can still be utilized in a meaningful way, even when this agent is not applied directly to the layer containing the activated carbon, which adsorbs the bacteria, but rather is contained in another, separate layer of the wound compress, so as to make available the full adsorption capacity of the layer that contains the activated carbon for the adsorption of malodorous substances, bacteria, and the like.

In this regard, the additional layer that contains the antimicrobial agent may be present in the form of a flat textile

material, especially a nonwoven fabric or a woven or knitted fabric. A flat textile material of this type can be provided with the antimicrobial agent by impregnation or by the application of a suitable finish, especially a secondary finish. Alternatively or additionally, however, it is possible to produce the flat textile material from filaments, fibers, and/or yarns that already contain the antimicrobial agent. If these filaments, fibers, and/or yarns are polymers, the antimicrobial agent can be introduced into them before and/or during the polymerization. In this way, textiles with antimicrobial properties are obtained, which are permanently fixed in the textile and cannot be washed out.

Additionally or alternatively to a flat textile material that contains the antimicrobial agent, the wound dressing of the invention may also contain another layer in the form of a foil that contains the antimicrobial agent. This foil and/or the flat textile material containing the antimicrobial agent can be joined, especially with adhesives and/or by needling, with the layer containing the activated carbon or with another layer of the wound dressing, such as an absorbent layer, a cover layer or the like, so as to ensure a permanent positional relationship between the layer containing the activated carbon and the layer containing the antimicrobial agent and to achieve an especially

reliable reduction of the risk of infection.

In this regard, the antimicrobial agent may be released in doses from the at least one additional layer and/or it may act by surface contact. In the case of dosed release, it is especially preferred for the antimicrobial agent to be released in low, but still sufficient, concentration over a period of several days.

In a preferred embodiment of the invention, metals or metal ions are used as antimicrobial agents, and the use of silver or silver ions is especially preferred. In this regard, the antimicrobial agent may contain a silver zeolite, a crystalline material, such as silver zirconium phosphate, or even an amorphous, glassy compound that releases silver ions.

If large amounts of wound secretions are to be absorbed by the wound dressing of the invention, as in the case of wound dressings intended for the covering of surface wounds, it has been found to be especially advantageous to provide an absorbent layer as well. In this regard, contamination of the area around the wound, especially the clothing in the vicinity of the wound, can be prevented by additionally providing a layer for protecting the clothing on the side of the absorbent layer, which faces away from the layer containing the activated carbon.

The antimicrobial agent of the wound dressing of the invention may contain chitin, chitosan, trichlosan, and/or



chlorhexidine.

The invention is explained below with reference to the drawing, which reveals all essential details of the invention not described above.

Figure 1 shows a schematic representation of an embodiment of the invention.

The wound compress 10 shown in Figure 1 consists essentially of a flat structure 12 that contains activated carbon and a cover layer 14 that completely surrounds this flat structure 12 and may be in the form of a covering material made of nonwoven fabric.

In the wound compress in accordance with Figure 1, the antimicrobial agent is contained in the cover layer 14.

The invention is not limited to the example illustrated in the drawings, but rather the use of bandage-like wound dressings or wound dressings suitable for the tamponade of deep wounds is also possible. Furthermore, the wound dressing of the invention may also be provided with additional functional layers.

## CLAIMS

1. Wound dressing, especially a wound compress, which comprises a layer (12) that contains activated carbon and at least one other layer that contains an antimicrobial agent, characterized by the fact that the at least one additional layer is a cover layer (14) for the layer containing the activated carbon and contains filaments, fibers, and/or yarns that contain the antimicrobial agent.

2. Wound dressing in accordance with Claim 1, characterized by the fact that the cover layer (14) for the layer containing the activated carbon is a flat textile material, especially a nonwoven fabric or a woven or knitted fabric.

3. Wound dressing in accordance with Claim 1 or 2, characterized by the fact that the filaments, fibers and/or yarns consist of polymers, and the antimicrobial agent is introduced into the filaments, fibers, and/or yarns before the polymerization.

4. Wound dressing in accordance with any of the preceding claims, characterized by the fact that the at least one additional layer has a foil that contains the antimicrobial agent.

5. Wound dressing in accordance with either of Claims 3 and 4, characterized by the fact that the foil and/or the flat

textile material is joined, especially with adhesives and/or by needling, with the layer that contains the activated carbon and/or with another layer of the wound dressing, such as an absorbent layer (18).

6. Wound dressing in accordance with any of the preceding claims, characterized by the fact that the antimicrobial agent is released in doses from the at least one additional layer.

7. Wound dressing in accordance with any of the preceding claims, characterized by the fact that the antimicrobial agent is effective by contact with the surface.

8. Wound dressing in accordance with any of the preceding claims, characterized by the fact that the antimicrobial agent contains silver and/or silver ions.

9. Wound dressing in accordance with any of the preceding claims, characterized by the fact that the antimicrobial agent contains silver zeolite, a crystalline material, such as silver zirconium phosphate, and/or a glassy compound.

10. Wound dressing in accordance with any of the preceding claims, characterized by the fact that the antimicrobial agent is contained in a layer (16) which is arranged between the cover layer (14) and the layer (12) containing the activated carbon and which is preferably joined with the layer containing the activated carbon.

11. Wound dressing in accordance with Claim 10, characterized by an absorbent layer (18) and/or a clothing protection layer (20) arranged on the opposite side of the layer (12) containing the activated carbon from the side covered by the layer (16) containing the antimicrobial agent.

12. Wound dressing in accordance with any of the preceding claims, characterized by the fact that the antimicrobial agent contains chitin, chitosan, trichlosan, and/or chlorhexidine.

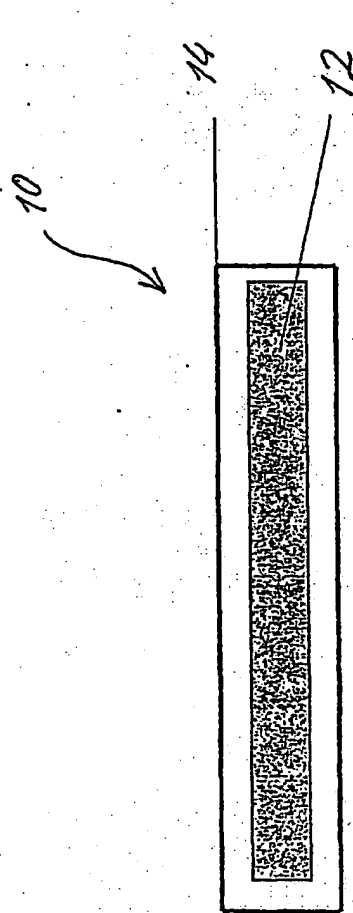


Fig. 1

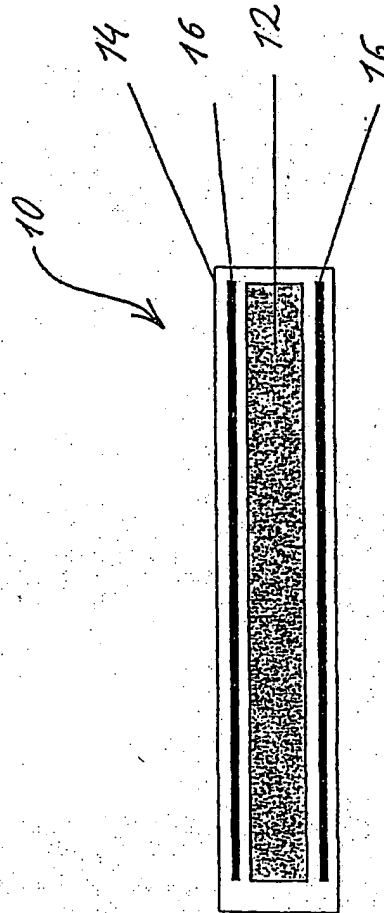


Fig. 2

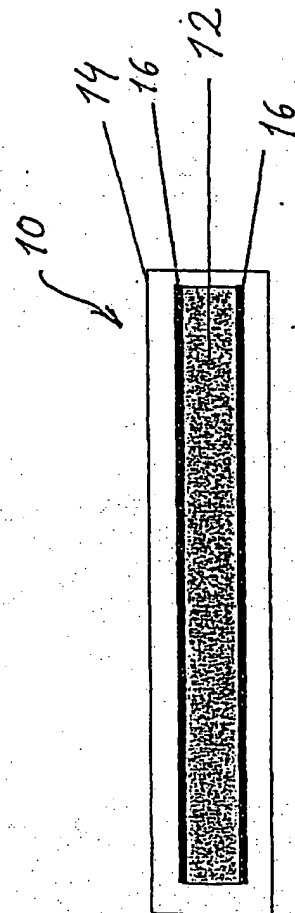


Fig. 3

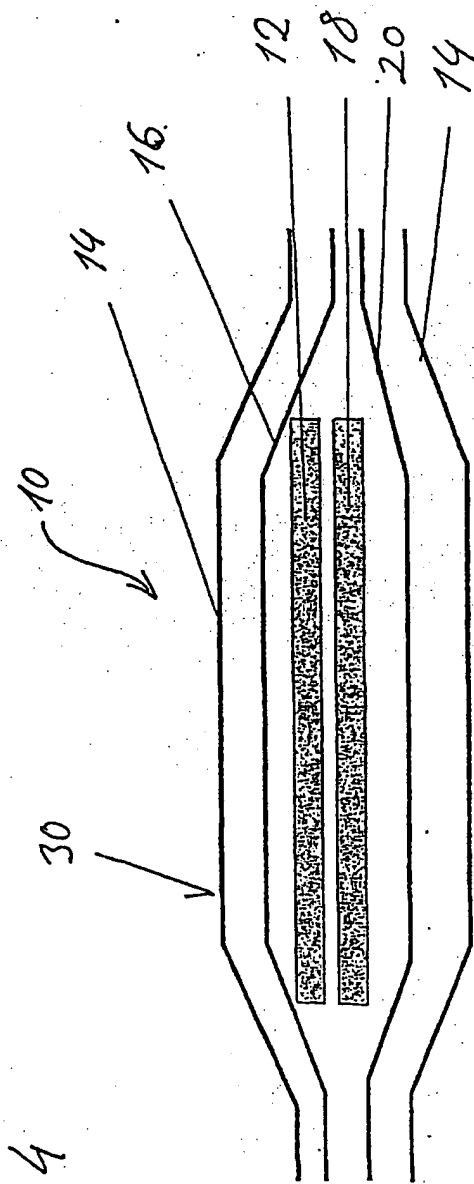


Fig. 4

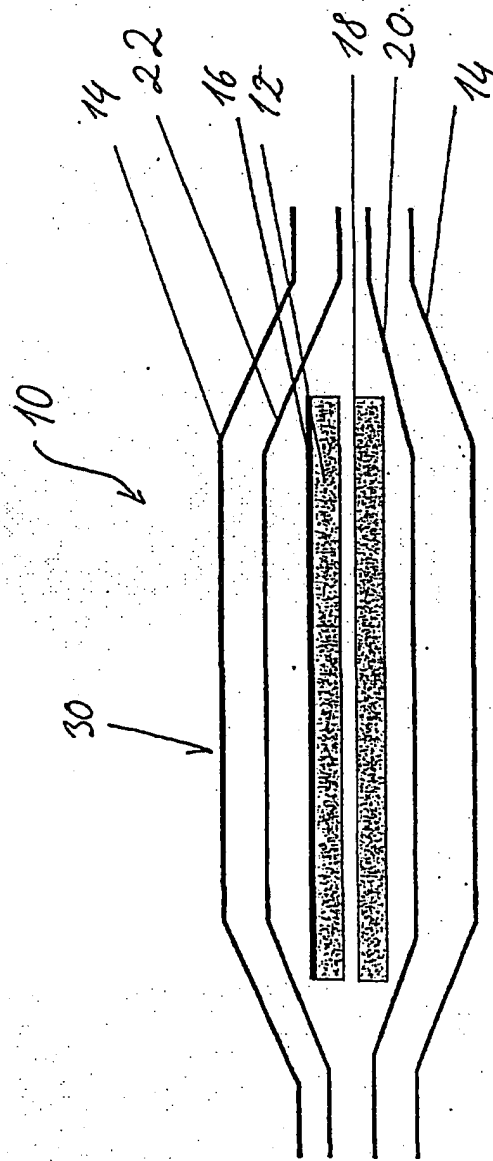


Fig. 5

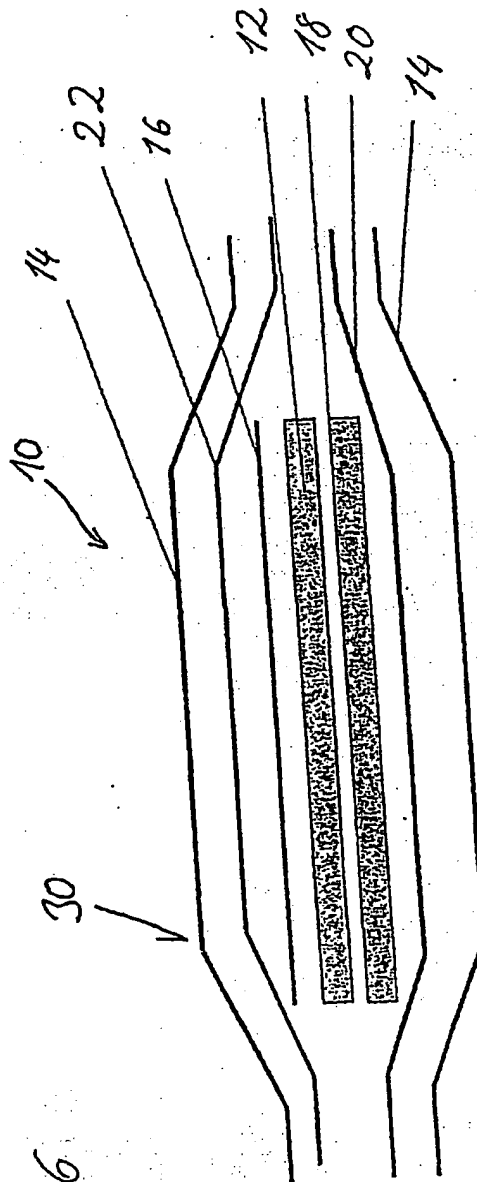


Fig. 6